

PATENT APPLICATION

APPARATUS AND METHOD FOR ANIMATION

PAD PRINTING

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APPARATUS AND METHOD FOR ANIMATION PAD PRINTING

5 CROSS_REFERENCE TO RELATED APPLICATIONS

The present application is related to both application Serial No. _____ (20003-7015) entitled "APPARATUS AND METHOD FOR IMAGE CAPTURE AND PAD TRANSFER" and application Serial No. _____ (20003-7003) entitled "APPARATUS AND METHOD FOR PAD TRANSFER" and both filed
10 on even date herewith. These related applications hereby expressly incorporated by reference for all purposes.

BACKGROUND OF THE INVENTION

The present invention relates generally to printing systems, and more particularly to printing systems for transferring a series of images to a pad of transfer
15 medium.

There are many types of printing systems available today. These systems include dot-matrix, thermal printers, electrostatic image transfer, ink ejection, and the like. These systems are adapted for printing successive images on individual sheets of separate pages drawn from a paper reserve stack. There are many different mechanisms
20 for extracting individual sheets and directing them to the image application portion of the printer. What these printers have in common is that the printing systems are adapted for accessing, controlling, routing and printing a single sheet at time.

Pads of note paper, such as Post-It® brand sticky note pads available from 3M Corporation of Minnesota, are well known. These pads include stacks of pages
25 releasably secured to each other with a tacky adhesive that permits an individual page to be removed from the pad and re-adhered to another surface. This feature of releasable securement to successive surfaces is a desirable trait of these products.

Currently to produce an image on a sticky note, a user either writes or otherwise applies some text or graphic element on the topmost page of the pad of sticky note. Later, the user removes the note to reposition it to the desired location. It would be advantageous to use a printing system to apply the element to the sticky note page.

- 5 However, the current printing systems are incapable of printing on such a pad. 3M offers a solution for printing on a preformed matrix of single layer note pages arranged in a standard 8" x 11" format for running through a conventional printer.

This solution has disadvantages in that it requires access to, and use of, a full-size printer and associated computer system to reproduce the element on the note.

- 10 Also, the user has to obtain pages of the special format, as well as special software for use in cooperation with the computer system operating the printer.

Animation books are also known. An animation book includes a series of sheets of paper bound together. Each page has some image on it, with the collection of images related to each other to provide a sense of animation when the images are

15 displayed successively. This effect is similar to motion picture technology in projecting many frames per second of one or more sets of related images.

Currently, quality animation books, or flip-books, are available commercially. It is known for an animator to hand apply sequenced images individually to sets of pages to produce a rudimentary animation book. However, such a solution does

20 not produce animation books of sufficient quality, and the production is often limited to the animator's artistic skills. There are systems, including personal computers and software for generating animation sequences from images. But these sequences must be viewed on the computer system or converted into video/film presentations for later viewing.

25 SUMMARY OF THE INVENTION

The present invention includes apparatus and method for image sequence transfer onto one of a plurality of a pad medium pages while the pages are aggregated together. A preferred embodiment for a printer includes An image transfer apparatus, including a housing; an image transfer engine for transferring a series of images at a

transfer position; and a transfer medium registration system for positioning a pad including a plurality of transfer media releasably secured to one another, wherein the transfer registration system locates a series of individual ones of the transfer media at the transfer position to receive different images of the series of images. The image sequence transferring method includes positioning a pad at a transfer position of a transfer engine, the pad including a plurality of transfer media releasably secured to one another; and transferring a series of images to successive ones of the transfer media serially positioned at the transfer position.

The preferred embodiment of the present invention is provided as a stand-alone system for receiving a pad of a plurality of transfer media and for transferring a series of images to successive ones of the transfer media. Additionally, the printer may be incorporated into a portable image capturing device to directly transfer a captured image sequence onto the pad. To form the animation book, the images are transferred to successive media while each element is attached, or in some implementations, individual elements are collected in proper order and bound together. In the preferred implementation, a transfer registration system positions the series of transfer media elements at a transfer position of the transfer engine. Virtually any sequence of images may be transferred (e.g., captured sequences, related sets of still images, or image sets developed from one or more reference images (e.g., "morphing"), limited by the image transfer engine, the image source quality and pad size.

These and other novel aspects of the present invention will be apparent to those of ordinary skill in the art upon review of the drawings and the remaining portions of the specification.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block perspective view a preferred embodiment of the present invention for a pad animation printing system.

DESCRIPTION OF THE SPECIFIC EMBODIMENTS

Figure 1 is a block perspective view a preferred embodiment of the present invention for a pad transfer system 100. Transfer system 100 includes a housing 105, an image transfer engine 110, a transfer registration system 115 for receiving a pad 120.

5 Housing 105 contains the elements of pad transfer system 100. Housing 105 preferably also may be integrated into other devices(either physically or logically) to provide functionality such, as for example, image capture, image processing/animation generation, image storing, and/or image transmission. Pad transfer system 100 may also be enabled to work cooperatively with an image capture system, with the image capture
10 system physically or logically integrated with pad transfer system 100.

 Image transfer engine 110 is a device for applying a text or graphic element onto pad 120 when pad 120 is registered within transfer registration system 115. Image transfer engine 110 may include conventional printing systems such as, for example, a laser printer, an inkjet printer, a thermal printer, a dot-matrix printer, or the
15 like. Image transfer engine 110 may include imaging systems like stenciling and stamping as well. Therefore image transfer engine 110 of the preferred embodiment denotes a system that imparts a perceptible image onto or into one of a transfer medium of pad 120, and the term print is used in a generic sense to include all such transfer processes.

20 In some implementations, image transfer engine 110 uses a printing system that consumes a print resource during the transfer process (e.g., toner in a laser printer or ink in an inkjet printer). Pad printing system 100 may provide for replaceable resource sources 125 (e.g., an ink cartridge or toner cartridge) or provide for replacement of a complete image transfer engine 110 that is new or refurbished with a fresh supply of
25 the resource.

 Pad printing system 100 includes a processing unit for controlling the functions, and includes memory for storing program instructions and, in some cases, images in a format suitable for use with image transfer engine 110. This memory may include portions that are volatile, non-volatile or some combination. In some

implementations, pad printing system 100 includes one or more image access ports 130, coupled to the controller, memory, or directly to image transfer engine 110. Image access port 130 is a receiver/receptacle adapted to operatively mate with memory modules storing one or more images for application using pad printing system 100, or for coupling
5 to another device or source of images, such as, for example, a computing system, a camera, a scanner, a video camera, or the like. Some implementations and embodiments of the present invention include rechargeable batteries to power the transfer functions. Access port 130 may be integrated into a docking station for receiving, storing, powering and otherwise interfacing to the image transfer system or to an image capture system, or
10 both. The docking system may be used for systems lacking the rechargeable batteries.

In some implementations of the preferred embodiment, pad transfer system 100 includes a display 135 for reproducing a facsimile of an image sequence to be transferred to, or transferred by, image transfer engine 110. Display 135 also provides feedback during control or operation functions. A portion of display 135 provides
15 feedback regarding the status of the image transfer process, such as that system 100 is ready to begin transfer, transfer is ongoing, and/or transfer has completed.

A control system 140 includes one or more buttons coupled to the controller for actuating an image transfer process, selecting an image or image sequence for transfer, accessing images through access port 130. In the preferred embodiment,
20 control system 140 includes a "PRINT" button, the actuation of which initiates an animation transfer process.

Print registration system 115 receives pad 120 and positions a series of individual ones of transfer medium elements of the plurality of transfer media at a location to cooperate with image transfer engine 110 in the image transfer process. Pad
25 120 of the preferred embodiment is a stack of uniformly sized transfer medium elements (e.g., sheets of paper, though other substrates or materials are possible, including Mylar film, decals, etc.) secured to each other, preferably by edge-laminate-adhesive binding. In the preferred embodiment, pad 120 is a stack sheets of paper bound together to permit sheets to be easily moved out from the transfer position while remaining secured to pad

120. Registration system 115 locates the current transfer medium element at the print position and holds pad 120 during the image transfer process.

In some embodiments, registration system 115 may position the bottommost transfer medium, or some other portion of pad 120. Registration system 115
5 may include an adapter/cartridge for holding pad 120 during image transfer. Such an adapter/cartridge is configurable to permit registration of different sized pads 120 (size differing in thickness and/or peripheral dimensions).

Registration system 115 includes a flipper 145 for separating and moving/repositioning a single transfer medium element of pad 120, either before image
10 transfer or after. Flipper 145, depending upon its functions, may be implemented in numerous different ways. A simple implementation includes a blade or roller that slides between a sheet and the remainder of the pad to lift, separate and move the sheet.

It is understood that pad print system 100 may also be implemented as a simple device without the display, access ports, and controls. When inserting pad 120
15 sufficiently far into registration system 115, image transfer begins. An LED is illuminated while the transfer process is in progress. When the LED extinguishes, pad 120 is removed with one of the pages bearing the transfer image.

In operation, a user loads pad 120 into registration system 115 that in turn locates one of the transfer medium at the desired location. A user selects a particular
20 image sequence for transfer, either from internal memory or from an external source through image access port 130. The selected image sequence is viewed on display 135, and the user actuates the "PRINT" button to initiate the transfer system. When the transfer process is completed, pad 120, is removed from pad printing system 100. Flipping the individual elements of pad 120 simulates animation according to the image
25 sequence.

The above-described arrangements of apparatus and methods are merely illustrative of applications of the principles of this invention and many other

embodiments and modifications may be made without departing from the spirit and scope of the invention as defined in the claims.

These and other novel aspects of the present invention will be apparent to those of ordinary skill in the art upon review of the drawings and the remaining portions
5 of the specification.